Applicant(s): Masahiko NAMERIKAWA, Kazuyoshi SHIBATA and Masaki IWAMOTO Serial No.: 10/650,488

Title: LAMINATE-TYPE PIEZOELECTRIC DEVICE AND METHOD FOR MANUFACTURING THE SAME Our Docket No.: 815\_010



FIG.1

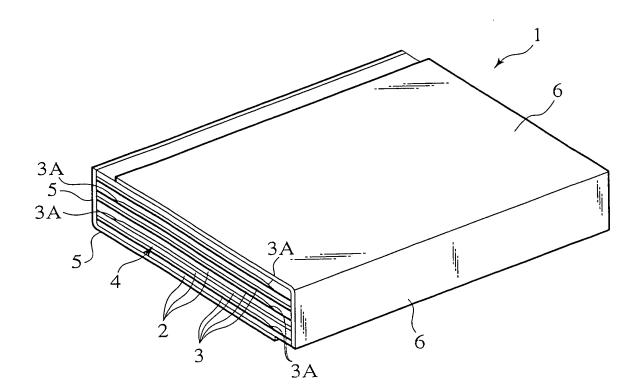


FIG.2

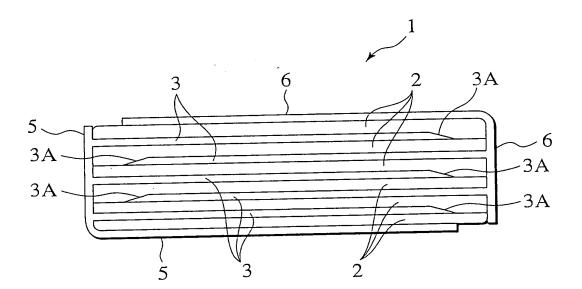


FIG.3

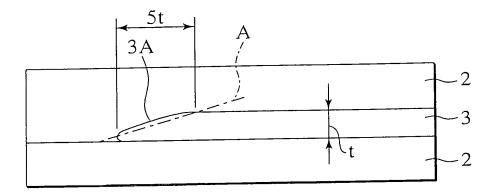
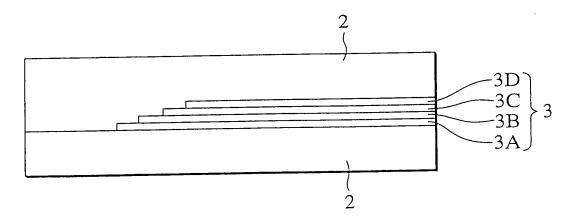


FIG.4



## FIG.5

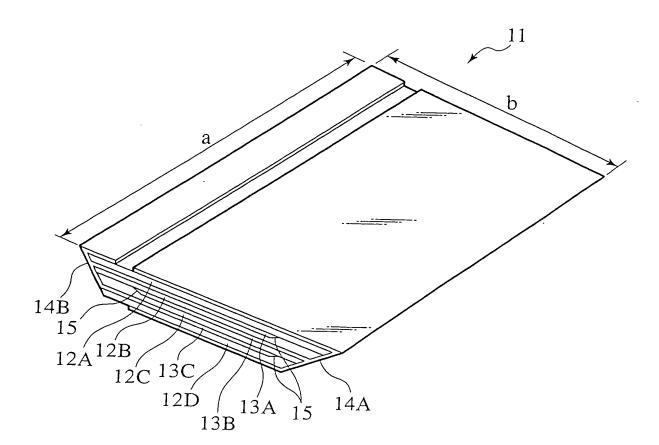


FIG.6

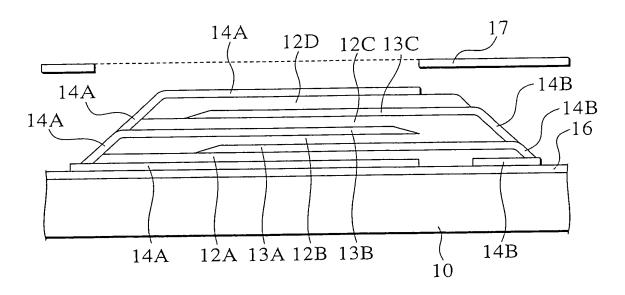


FIG.7

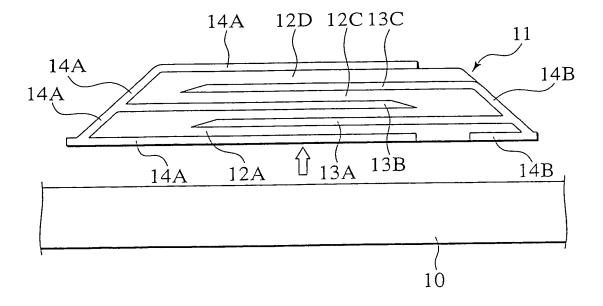


FIG.8

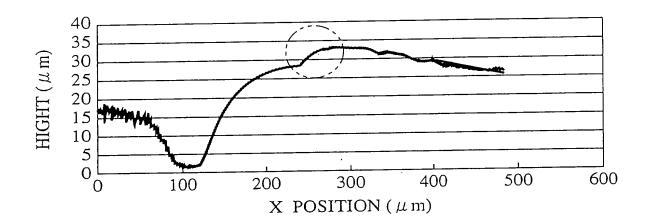
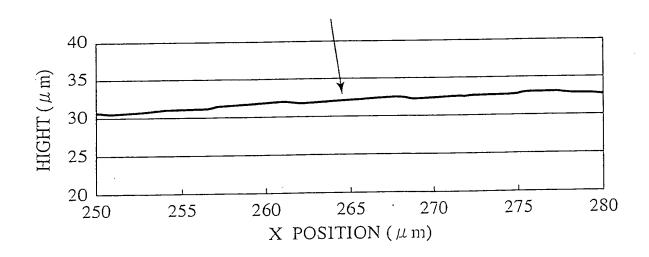


FIG.9



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## FIG.10

ELECTRODE PASTE PARTICLE DIAMETER, MEAN (μm)	ELECTRODE PASTE BINDER, PART (wt%)	ELECTRODE PASTE SOLVENT, PART (wt%)	ELECTRODE PASTE VISCOSITY (Pa·sec)	NONFIRED CERAMIC LAYER SURFACE ROUGHNESS (Ra, μm)	ELECTRODE ANGLE (deg.)
0.050	5.0	10	4200	0.3	35
4.5	5.0	10	50	0.3	1.7
1.5	5.0	25	25	0.3	1.4
1.5	5.0	4.0	3300	0.3	33
1.5	5.0	10	300	0.3	14
1.5	0.7	10	32	0.3	1.8
1.5	12	10	3100	0.3	32

FIG.11

PIEZOELECTRIC / ELECTROSTRICTIVE PASTE		NONFIRED CERAMIC		
POWDER PARTICLE DIAMETER, MEDIAN (μm)	BINDER, PART (wt%)	LAYER SURFACE ROUGHNESS (Ra, $\mu$ m)	ELECTRODE PASTE VISCOSITY (Pa · sec)	ELECTRODE ANGLE (deg.)
0.050	5.0	0.090	300	5.0
5.2	5.0	0.60	300	31
0.50	31	0.060	300	3.0
0.50	0.4	0.70	300	33
0.50	5.0	0.10	300	6.0
0.50	5.0	0.60	300	32